AMATEUR SATELLITE REPORT

AMSAT's Newsletter for the Amateur Space Program.

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Short Bursts

• Launch of a Mode-J transponder payload aboard a balloon from Transkei Province, South Africa was due to take place at about 0600 UTC, 26 Feb 83. (See *ASR* #51). Taken to 47 km altitude (26 miles), the transponder will connect Mode-J stations up to 2,000 km (1,200 miles) apart. Reports on hf were to be relayed on 21.280 MHz.
• Launch of AMSAT's Phase IIIB satellite on Ariane L6 is now firming on 3 June 1983.
• Shipments of the Project OSCAR Orbital Prediction Calandar are now being made with delivery within one week assured.
• PACSAT concept review meeting was held at Goddard Space Flight Center 25-27 Feb 83. Attendees from across the globe and from diverse interests attended. Full story in the next *ASR*.
• ARRL President Vic Clark, W4KFC, will be the guest when the LIMARC Repeater Network links up again 3 March 83. Vic will be responding to questions and presenting a talk on Amateur Radio's Future. He plans to address the part OSCARs will play too. Joe Reisart, W1JR, will give a presentation to the same net in June. Barry Goldwater, K7UGA, is the primary guest for September. AMSAT is alternate to K7UGA in September and primary for December. Watch these columns for further details.

Big ARRL Donation Boosts Fund Drive

ARRL Foundation President Robert York Chapman, W1QV, has presented AMSAT Chairman John Browning, W6SP, with a check for $20,000 to help in financing AMSAT's Phase IIIB spacecraft. At a recent meeting in Los Angeles Mr. Chapman presented the check which comprised $10,000 from the Foundation and an additional $10,000 voted by the ARRL Board of Directors. In recent years ARRL support of AMSAT's Phase III Program has amounted to nearly $100,000 raised by ARRL through its members and through matching funds.

ARRL's donation comes at a propitious time. "Although the annual renewal campaign is rejuvenating our depleted coffers, the ARRL input is most welcome and will certainly balance a further draw down on reserves as we approach the Phase IIIB launch campaign," remarked AMSAT Executive Vice President Vern "Rip" Riportella, WA2LQQ. "January is always the leanest month since renewals are just beginning to appear, the big campaign at Dayton is months away and end of year bills have arrived. The timing could hardly have been better," added WA2LQQ.

ASR expresses the sincere thanks of all AMSAT members and amateur space advocates for the continued, enthusiastic support AMSAT enjoys from ARRL! Thanks folks.!

RS Notes From K1HTV

The RS5 telemetry beacon (29.452 MHz) was heard today (Feb 7) in the dwell mode sending a series of either "E01" or "EG01." This is normally the battery voltage telemetry channel and a reading of 01 translates to a dead battery. The RS-5 satellite however is far from dead and seems to be operating properly even in darkness so the meaning of the 01 raw data on channel "E" and "EG" is unclear. Maybe it has something to do with the codestore message.

Although the RS-5 transponder has been commanded off, three channels have been operational: the 29.452 MHz telemetry beacon, the 29.350 MHz service channel which retransmits cw on 145.850 MHz, and the Robot-Codestore channel on 29.330 MHz. This latter channel is presently being used by a Soviet Antarctic expedition whose communications group is headed by Leo Labutin, 4K1CR (UA3CR). (Picture appeared in *ASR* #50.) Because of the unreliable hf propagation between the Antarctic and the U.S.S.R., the expedition is using the store and forward (codestore) capability of RS-5 to exchange messages between the Soviet Antarctic base(s) and Moscow.

On Monday, February 7th the following message was copied at about 21:30 UTC from the RS-5 beacon on 29.330 MHz.

"UA3AJH UW3CX SRO(OE)NO [OE sent as one letter sounds like cheh] DAJTE SEANSY KOSPASA QTH NEOBHODIMO OTMETITX KARTE ULETAM 10 FEW DE 4K1CR 4VUV."

A quick call to Dex Anderson, W4KM, provided the following translation of the above Russian message to English. It says: "UA3AJH UW3CX (in Moscow), URGENTLY GIVE (us) PASSES (orbital info) on KOSPASA.

It is NECESSARY TO NOTE the QTH ON MAP. FLY OUT on FEB 10. FROM 4K1CR (call sign of Leo, UA3CR)."

The KOSPASA mentioned refers to the Soviet KOSPAS search and rescue satellite which was launched on June 30, 1982 as part of a joint international effort by the United States, the U.S.S.R., France and Canada. KOSPAS and SARSAT satellites are to be used to locate downed civil aircraft and ships. The first rescue mission occured on Sept. 10, 1982 when a downed Canadian plane was found using the Soviet KOSPAS satellite.

From the message one can speculate that the reason for the Antarctic expedition wanting the orbital data for the KOSPAS satellite is that they are going to do some transmitting on one of the ELT (Emergency Locating Transmitter) frequencies to test the bird. The results should incicate on the map just where on the Antarctic continent the Soviet base is located.

(More notes from K1HTV in the next issue.)

Mystery Signals Sign "RSØØ

The exact identity and significance of radio signals heard in England on 20 Feb are a mystery as we go to press. Reports from G3RWL, G2UK and G3IOR have it that a "very strong signal was heard on 29.503 MHz signing RS ØØ from 13:50 to 13:59 UTC and again from 15:17 to 15:27 UTC."

Although first suspected to be of terrestrial origination, later investigation by K1HTV through G3IOR confirmed the presence of Doppler shift; usually conclusive evidence of a satellite-borne emitter. According to K1HTV, "If the TCAs were 13:55 and 15:22 UTC, then it indicates a period of about 87 minutes." First reports had the period at 103 minutes but that value has now been discounted by later data.

If initial observations are replicated, an 87 minute orbit would indicate a very low orbiting satellite. At an altitude of about 170 miles it would quickly decay from orbit if station keeping propellants are absent (as they quite probably are). This altitude corresponds to prior ISKRA (Spark) missions but it is not clear how this apparently new satellite got to its present orbit. G3RWL was said to be consulting Geoffrey Perry, the famous civilian satellite watcher, but Perry could add no insight to the mystery as of 20 Feb.

When heard by English Amateurs the signals' source was South Southeast at AOS and North Northeast at LOS. Stations observing this unknown satellite are asked to make careful observation reports and to forward to AMSAT HQ by best means. The signals had not been heard again as of 21 Feb press deadline.

ARRL Taps AMRAD President For Technical Slot

ARRL General Manager Dave Sumner, K1ZZ, has told *ASR* that Mr. Paul Rinaldo, W4RI, has been selected to become ARRL's new Technical Editor of the *QST* staff. He will replace the retiring Doug DeMaw, W1FB, in early May. Paul will report directly to K1ZZ who, in addition to being ARRL General Manager, is Editor of *QST*.

Paul has had a distinguished career in advanced Amateur Radio circles and is currently President of AMRAD, The Amateur Radio Research and Development Corportion, a non-profit scientific/educational corporation. He also edits the AMRAD newsletter as well as *QEX*, ARRL's new advanced experimenter's newsletter. Paul has been an AMSAT Life Member almost from its founding (LM-36) and is an ardent advocate of Amateur Radio satellites.

Among the seemingly endless accomplishments Paul has to his credit are experiments in spread spectrum (under an STA) and packet radio development including a key role in the recent AMSAT-sponsored PACSAT meetings which resulted in new standads (AX.25) for Amateur Packet Radio protocol. He has published several articles in Amateur Radio journals. Professionally Paul has recently been a consultant to computer and networking concerns.

In a recent telephone interview with *ASR* Paul expressed "continued enthusiastic support for AMSAT. I hope to further the close ties especially in the technical area, between ARRL and AMSAT. I plan to further emphasize satellite communications in ARRL publications."

A landmark survey conducted by Florida State University for ARRL in 1979 indicated a strong predeliction of Amateurs for digital communications and personal computing. In selecting W4RI to head ARRL's technical department, *ASR* believes a major coup has transpired. It is hard to conceive of a more deft choice given the inevitable "digitization" of Amateur Radio in the next decade! Well done!

New Sked For AO-8 Announced

AMSAT OSCAR 8 Operations Manager W9KDR has announced a revised schedule for AO-8 effective immediately. The new schedule calls for Mode A on (UTC) Sundays, Mondays and Tuesdays, Mode J on Thursdays, Fridays and Saturdays. On Wednesdays AO-8 will be in recharge mode with even the beacon turned off for better charge rate.

AO-8 will be five years old on 5 March 83. There has been concern voiced recently about the overall battery condition. (*ASR* #51) AO-8 Command Stations W9KDR, W3HV, K3NW and W6CG as well as observer K9CIS have been closely monitoring battery condition as it is reflected in telemetry channel 3 according to W9KDR.

For several years AO-8 has been in dual AJ Mode twice a week. Although this provides a very heavy load, the strong battery in conjunction with careful monitoring has provided a maximum of satellite usefulness according to W9KDR. Now, with battery aging evidenced, more prudent power budgets are sought. The new schedule reflects the new realities together with an implicit recognition of the preponderance of Mode A time afforded by the several Radio Sputniks now operational.

"It's not generally known, but Mode J actually draws more power than Mode A." suggested Bernie Glassmeyer, W9KDR, from ARRL HQ recently. "In the past, when the batteries were new, we could live with dual AJ, but those days are over for the forseeable future," addded W9KDR. "Our aim has been to strike a balance of service between Mode A and J but always with the health of the spacecraft uppermost in our minds. And though we presently don't see a great threat

to the spacecraft, we want to assure its continued service by careful operations planning," Bernie concluded.

Launched from Vandenberg AFB, California on March 5, 1978, AMSAT OSCAR 8 has made over 25,000 orbits in nearly 5 years in orbit traveling 722 million miles (nearly four round trips to the sun) at an average velocity of 16,700 miles per hour!

Event Celebrates Radio Revelation

Fifty years ago a young radio engineer working in Holmdel, New Jesdey announced a discovery that would ultimately change man's understanding of the entire universe. Over a period of four years Karl G. Jansky, while trying to identify radio interference sources, came to the revolutionary finding that a mysterious hiss at 20.4 MHz actually originated from the galactic center; the Milky Way!

His revelation gave birth to the science of radio astronomy. Using modern equipment scientists can "peer" at radio frequencies virtually to the "boundaries" of the known universe some 12 to 15 billion light years distant.

Now scientists and technicians at the National Radio Astronomy Observatory at Green Bank, West Virginia plan to commemorate the 50th Anniversary of Jansky's discovery. Amateur Radio operators around the world will be able to participate using their home stations to communicate with various commemorative stations established at Green Bank.

The commemoration will occur on two consecutive weekends in May. On May 7-8 Amateur Radio station K8HUH will operate on the Amateur 15-meter band using Jansky's reconstructed antenna. Frequencies of operation will be: 21.03 and 21.13 MHz cw and 21.36 MHz ssb.

On the subsequent weekend, May 14-15, an even more exotic Amateur Radio event will transpire. Stations around the would will be invited to communicate with a huge radio telescope "dish" at Green Bank by bouncing signals off the moon. A super-specialized art in Ham Radio, only about 1% of all hams have both the skill and equipment to succeed using the tenuous earth-moon-earth (EME) path. Signals were first bounced off the moon just after World War II by a powerful radar in Massachusetts. Hams have been doing it on various vhf and uhf frequencies since the mid-fifties. The NRAO event will use 70-cm EME signals. Because of the tremendous sensitivity of the 140-foot dish to be used at Green Bank, quite modest Amateur stations will be able to communicate with distant stations far beyond their normal radio range (horizon) at uhf. As little as 1000 watts effective radiated power (ERP) should be adequate according to AMSAT President W3IWI, Dr. Thomas A. Clark, himself a NASA Radio Astronomer and avid EME proponent.

According to Dr. Clark, "This EME opportunity should provide many. . . uhf enthusiasts with a unique opportunity to work a rare state and to test their station hardware in advance of the Phase IIIB launch." Tom points out that the 1000-watt ERP level is about what will be required to use Phase IIIB, Mode B. As little as 200 to 400 watts ERP could be used for cw with good results.

The EME schedule is as follows: 13 May/22:00 UTC - 14 May/01:15 UTC; 14 May/12:00 UTC - 15 May/02:15 UTC; 15 May/12:45 UTC - 16 May/03:30 UTC.

A total of 31 hours of activity is scheduled. Participating Amateurs associated with NRAO will be WB4ZJO, N4HTL, K8HUH, W3IWI, KA8QIJ, WA1UAB, N4FWA, K2AOE, VK2BMZ, N4HTK, W4OZJ, KA8NQR, W8MIF.

Additional details will appear in these pages as well as AMSAT and ARRL bulletins.

Orbital Information from KA9Q

```
noaa-6:
Wed Feb 16 01:39:45 1983 UTC: Ascending node at       91.8 west
Nodal period: 101.14670 min
Longitude increment: 25.287038 deg w/orbit
Element set #403
Element set epoch: Tue Feb  1 14:23:28 1983 UTC

noaa-7:
Wed Feb 16 00:50:28 1983 UTC: Ascending node at      148.0 west
Wed Feb 16 02:32:27 1983 UTC: Ascending node at      173.5 west
Nodal period: 101.97913 min
Longitude increment: 25.493527 deg w/orbit
Element set #182
Element set epoch: Tue Feb  1 17:30:38 1983 UTC

oscar-9:
Wed Feb 16 01:32:47 1983 UTC: Ascending node at      155.7 west
Nodal period: 94.74918 min
Longitude increment: 23.686374 deg w/orbit
Element set #406
Element set epoch: Mon Feb  7 09:05:13 1983 UTC

rs-3:
Wed Feb 16 00:57:08 1983 UTC: Ascending node at      116.6 west
Wed Feb 16 02:55:39 1983 UTC: Ascending node at      146.3 west
Nodal period: 118.51900 min
Longitude increment: 29.756545 deg w/orbit
Element set #48
Element set epoch: Mon Jan 31 13:35:35 1983 UTC

rs-4:
Wed Feb 16 00:47:49 1983 UTC: Ascending node at      110.2 west
Wed Feb 16 02:47:13 1983 UTC: Ascending node at      140.1 west
Nodal period: 119.39389 min
Longitude increment: 29.975520 deg w/orbit
Element set #83
Element set epoch: Tue Feb  1 02:36:53 1983 UTC

rs-5:
Wed Feb 16 00:33:42 1983 UTC: Ascending node at      105.9 west
Wed Feb 16 02:33:15 1983 UTC: Ascending node at      135.9 west
Nodal period: 119.55515 min
Longitude increment: 30.015801 deg w/orbit
Element set #71
Element set epoch: Tue Feb  1 11:51:32 1983 UTC

rs-6:
Wed Feb 16 00:12:11 1983 UTC: Ascending node at      104.3 west
Wed Feb 16 02:10:53 1983 UTC: Ascending node at      134.2 west
Nodal period: 118.71623 min
Longitude increment: 29.805900 deg w/orbit
Element set #47
Element set epoch: Thu Feb  3 11:27:19 1983 UTC

rs-7:
Wed Feb 16 01:41:14 1983 UTC: Ascending node at      124.5 west
Nodal period: 119.19488 min
Longitude increment: 29.925641 deg w/orbit
Element set #87
Element set epoch: Sun Jan 30 12:22:14 1983 UTC

rs-8:
Wed Feb 16 00:30:46 1983 UTC: Ascending node at      104.3 west
Wed Feb 16 02:30:32 1983 UTC: Ascending node at      134.4 west
Nodal period: 119.76312 min
Longitude increment: 30.067900 deg w/orbit
Element set #186
Element set epoch: Sat Feb  5 03:01:46 1983 UTC
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oscar-7:
Wed Feb 16 01:42:17 1983 UTC: Ascending node at 120.1 west
Nodal period: 114.93928 min
Longitude increment: 28.736791 deg w/orbit
Element set #478
Element set epoch: Tue Nov 30 09:46:21 1982 UTC

oscar-8:
Wed Feb 16 01:13:50 1983 UTC: Ascending node at 98.4 west
Wed Feb 16 02:57:00 1983 UTC: Ascending node at 124.2 west
Nodal period: 103.16883 min
Longitude increment: 25.794538 deg w/orbit
Element set #730
Element set epoch: Sat Feb 5 10:44:51 1983 UTC

More Satellite Orbital Details from KA9Q

Satellite: noaa-6
Catalog number: 11416
Epoch time: 83032.59963657
Tue Feb 1 14:23:29 1983 UTC
Element set: 403
Inclination: 98.6048 deg
RA of node: 64.3949 deg
Eccentricity: 0.0012740
Arg of perigee: 70.6193 deg
Mean anomaly: 289.6357 deg
Mean motion: 14.24474370 rev/day
Decay rate: 2.36e-06 rev/day/day
Epoch rev: 18642
Semi major axis: 7189.828 km
Anom period: 101.089920 min
Apogee: 839.447 km
Perigee: 821.128 km

Satellite: noaa-7
Catalog number: 12553
Epoch time: 83032.72961022
Tue Feb 1 17:30:38 1983 UTC
Element set: 182
Inclination: 98.9791 deg
RA of node: 355.7601 deg
Eccentricity: 0.0014143
Arg of perigee: 69.8855 deg
Mean anomaly: 290.3848 deg
Mean motion: 14.12829697 rev/day
Decay rate: 2.11e-06 rev/day/day
Epoch rev: 8304
Semi major axis: 7229.256 km
Anom period: 101.923112 min
Apogee: 879.732 km
Perigee: 859.283 km

Satellite: oscar-7
Catalog number: 7530
Epoch time: 82334.40718817
Tue Nov 30 09:46:21 1982 UTC
Element set: 478
Inclination: 101.3994 deg
RA of node: 336.3150 deg
Eccentricity: 0.0011748
Arg of perigee: 269.7184 deg
Mean anomaly: 90.2542 deg
Mean motion: 12.53379655 rev/day
Decay rate: -2e-08 rev/day/day
Epoch rev: 36792
Semi major axis: 7829.772 km
Anom period: 114.889371 min
Apogee: 1481.375 km
Perigee: 1462.978 km

Satellite: oscar-8
Catalog number: 10703
Epoch time: 83036.44781742
Sat Feb 5 10:44:51 1983 UTC
Element set: 730
Inclination: 98.7617 deg
RA of node: 55.4344 deg
Eccentricity: 0.0006729
Arg of perigee: 335.9368 deg
Mean anomaly: 24.1456 deg
Mean motion: 13.96538531 rev/day
Decay rate: -2.6e-07 rev/day/day
Epoch rev: 25085
Semi major axis: 7285.352 km
Anom period: 103.112085 min
Apogee: 915.582 km
Perigee: 905.777 km
Translate freq: 581.0974 mhz
Invert: 1
Beacon: 435.0965 mhz

Satellite: oscar-9
Catalog number: 12888
Epoch time: 83038.37862622
Mon Feb 7 09:05:13 1983 UTC
Element set: 406
Inclination: 97.5268 deg
RA of node: 4.3446 deg
Eccentricity: 0.0004092
Arg of perigee: 51.4636 deg
Mean anomaly: 308.7109 deg
Mean motion: 15.20605361 rev/day
Decay rate: 9.392e-05 rev/day/day
Epoch rev: 7406
Semi major axis: 6883.669 km
Anom period: 94.699127 min
Apogee: 521.201 km
Perigee: 515.568 km
Beacon: 145.8250 mhz

Satellite: rs-3
Catalog number: 12997
Epoch time: 83031.56638590
Mon Jan 31 13:35:36 1983 UTC
Element set: 48
Inclination: 82.9591 deg
RA of node: 51.7807 deg
Eccentricity: 0.0057996
Arg of perigee: 321.3893 deg
Mean anomaly: 38.3046 deg
Mean motion: 12.15574253 rev/day
Decay rate: 4e-08 rev/day/day
Epoch rev: 4983
Semi major axis: 7991.332 km
Anom period: 118.462529 min
Apogee: 1667.736 km
Perigee: 1575.043 km

Satellite: rs-4
Catalog number: 13000
Epoch time: 83032.10895483
Tue Feb 1 02:36:54 1983 UTC
Element set: 83
Inclination: 82.9431 deg
RA of node: 55.4069 deg
Eccentricity: 0.0019852
Arg of perigee: 25.1708 deg
Mean anomaly: 335.0306 deg
Mean motion: 12.06657541 rev/day
Decay rate: 1.12e-06 rev/day/day
Epoch rev: 4953
Semi major axis: 8030.639 km
Anom period: 119.337919 min
Apogee: 1672.247 km
Perigee: 1640.362 km

Satellite: rs-5
Catalog number: 12999
Epoch time: 83032.49412781
Tue Feb 1 11:51:33 1983 UTC
Element set: 71
Inclination: 82.9528 deg
RA of node: 55.8639 deg
Eccentricity: 0.0011807
Arg of perigee: 59.7053 deg
Mean anomaly: 300.5173 deg
Mean motion: 12.05033255 rev/day
Decay rate: 1.1e-07 rev/day/day
Epoch rev: 4951
Semi major axis: 8037.852 km
Anom period: 119.498777 min
Apogee: 1684.901 km
Perigee: 1665.920 km

Satellite: rs-6
Catalog number: 13002
Epoch time: 83034.47731349
Thu Feb 3 11:27:20 1983 UTC
Element set: 47
Inclination: 82.9568 deg
RA of node: 51.0562 deg
Eccentricity: 0.0049352
Arg of perigee: 330.1211 deg
Mean anomaly: 29.7139 deg
Mean motion: 12.13551962 rev/day
Decay rate: 2.4e-07 rev/day/day
Epoch rev: 5010
Semi major axis: 8000.205 km
Anom period: 118.659938 min
Apogee: 1666.770 km
Perigee: 1587.805 km

Satellite: rs-7
Catalog number: 13001
Epoch time: 83030.51545114
Sun Jan 30 12:22:15 1983 UTC
Element set: 87
Inclination: 82.9572 deg
RA of node: 55.3301 deg
Eccentricity: 0.0022641
Arg of perigee: 351.8159 deg
Mean anomaly: 8.2533 deg
Mean motion: 12.08674407 rev/day
Decay rate: 9.2e-07 rev/day/day
Epoch rev: 4942
Semi major axis: 8021.707 km
Anom period: 119.138785 min
Apogee: 1662.150 km
Perigee: 1625.826 km

Satellite: rs-8
Catalog number: 12998
Epoch time: 83036.12622759
Sat Feb 5 03:01:46 1983 UTC
Element set: 186
Inclination: 82.9421 deg
RA of node: 54.7308 deg
Eccentricity: 0.0019926
Arg of perigee: 83.3798 deg
Mean anomaly: 276.9458 deg
Mean motion: 12.02935100 rev/day
Decay rate: 2.01e-06 rev/day/day
Epoch rev: 4986
Semi major axis: 8047.193 km
Anom period: 119.707206 min
Apogee: 1705.865 km
Perigee: 1673.795 km

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